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AUTHOR Sundby, Oliver; Franklin, Joe
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ABSTRACT

The current accountability process at Red Rocks Community College (RRCC) is based on a computer-managed instruction (CMI) system, containing student outcomes components, test items, student testing and evaluation information, student information, and reports for students, faculty, and administrators. The system was developed following extensive planning, with a grant allowing for the purchase of necessary software. The initial year's activities included the following: (1) identification of essential competencies and student outcomes for each program; (2) validation of the competencies in the work place and with four-year institutions; (3) a curriculum review for each degree and certificate program; (4) establishment of a computerized instruction management system to track student achievement by course and program; (5) development of evaluation criteria for student outcomes; and (6) administration of student and employer satisfaction surveys, resulting in program revision. Two curriculum development specialists, and advisory boards comprised of area employers, assisted the faculty with the development of competencies. Department chairs developed objective-based tests, and a qualified technical supervisor oversaw data collection and management. The system now uses reasonably priced scan forms, which help track over 300 courses and sections with 3,000 students for end-of-semester tracking. The CMI system also manages the creation and administration of objective-based tests created by the CMI office. The next major goal is to implement on-line testing. (JMC)

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Using an Automated Instructional Management System as a Foundation for Accountability at Red Rocks Community College

Oliver Sundby
Coordinator of Institutional Development and Research

and

Joe Franklin
Automated Instructional Management System Manager

Red Rocks Community College
Lakewood, Colorado

4th Annual Summer Institute on
Community College Effectiveness and Student Success
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In 1985, the Colorado Legislature passed statutes requiring colleges and universities in the state to determine "improvements in student knowledge, capacities, and skills between entrance and graduation." This process is, at Red Rocks Community College, taking place within the umbrella term of "accountability."

Accountability is a process of fundamental importance to the college, within which student needs and expectations are measured and interwoven with institutional self-improvement. The College sees this as an attitude, a way of thinking, that allows the institution to use information gathered from its constituents to make necessary alterations in curriculum and services in an ongoing effort to serve students more productively, and insure that students are more productive once they leave us.

Accountability is gaining ground as a theme within the college that addresses self management in a positive way. While it is very easy to see the process as an often intrusive requirement from the state level, we at Red Rocks are finding that our internal management skills and directions need to be looked at very carefully, even without the state impetus. Our feeling is that if we do in fact manage ourselves in an accountable, businesslike way, we will be doing our students and the community a very valuable service -- and we will essentially allow the state reporting requirements to take care of themselves. This is the essential point that we wish to emphasize at this meeting -- that a great deal of energy can be spent and wasted on negative reaction to state mandates, when instead the institution can create a positive culture for its own internal management and use that internal process as a foundation for state requirements. We are fortunate to have people at the state level that allow and even encourage individual colleges to use local discretion and initiative in developing these structures, and who understand that it will take many years to make the necessary progress toward the overall state goals.

While it is necessary to understand the college's attitude toward accountability both internally and externally -- the cultural aspect mentioned previously -- there is great value in discussing the specific approach to the process that we are taking. We feel that this is a somewhat unique process.

Objectives for accountability are currently focused on five major activity areas within the college. These are occupational education; transfer education; college preparatory education, developmental studies, and GED preparation and remedial programs; continuing education and community services and student services. The specific objectives focus on expected student performance, measures for assessing student knowledge and skills, student completion and retention data, student post-graduation employment and transfer data, and student and employer satisfaction data. At this point, we have not fully integrated the accountability process into the college's overall planning process in terms of long range planning and fiscal and administrative management.

The current accountability process is based upon a computer managed instruction program. It was developed following extensive planning and with the assistance of a grant which allowed us to purchase the necessary software. The initial year's activities were as follows, and remain essentially in place.

1. Identification of essential competencies for each program. This began with occupational programs, and was done by both faculty and administrators.

2. Development of a written list of student outcomes by program area.

3. Validation of competencies in the work place and with four year transfer institutions, involving surveys of area employers and transfer institutions most likely to be destinations of our students. This information was reviewed by program advisory committees, faculty and administration.

4. Review of each degree and certificate program for necessary modification in curriculum.

5. Establishment of the computerized instruction management system to track achievement levels on a student basis for each program and course.

6. Development of evaluation criteria for student outcomes.

7. Administration of student and employer satisfaction surveys.

8. Revision of programs based on student and employer input.

It is important to note that state officials are most interested, and we think correctly, in the changes made through the process that positively affect how we do business and how students progress, as opposed to the process itself.

The Computer Managed Instruction (CMI) system was purchased to aid instructors in helping students obtain their educational outcomes. The Red Rocks system contains student outcomes components, test items, student testing and evaluation information, student information and reports for students, faculty and administrators. The CMI system provides an effective mechanism for evaluating student progress, and will hopefully be integrated into the study of student retention. We feel that as we integrate the CMI process with placement testing and counseling processes, we will be able to significantly improve our ability to direct students to the correct programs and classes and enhance their ability to stay on track.

The remainder of the discussion will be directed at examples of ongoing CMI procedures and documentation.

The Automated Instruction Management System was purchased in 1988 from ABACUS. The company is located in Portland Oregon. Red rocks purchased Computer Managed Instruction (CMI) with money from its 1985 Title III grant award for the purpose of responding to state Accountability requirements. ABACUS was purchased by IBM in 1991, and changed CMI to IMS. Red Rocks has not yet made the title change, because the system is just beginning to become well known on campus. CMI (Computer Managed Instruction) is the same as IMS which stands Automated Instructional Management System. The system has been up and operational since the spring of 1989.

The system originally ran on an IBM ps2 with a 40 megabyte hard drive. Within six months of operation our technical crew had it running on a "Lantastic" network. CMI currently operates on Novell 3.11., has its own server in the College's Computer Lab and is bridged to the faculty network file server. All faculty and staff have access to the system through the faculty network.

In the beginning the system design the college purchased was already two years old, therefore many of the bugs were taken out by the time we purchased it. It did not require extensive maintenance, and ABACUS maintenance was always available when problems arose. The data entry fields were originally created for K-12, but RRCC needed to track 3000 students against thousands of objectives, therefore, we didn't have enough room to code everything into the system. ABACUS worked on this problem for RRCC and was able to add the necessary fields within the first year. The stand-alone version with 40 megabytes of memory did not have the required capacity, and our technical supervisor had to set up the network before ABACUS themselves had created a network version. Looking back, we would have implemented the system more patiently, and only added those courses/objectives that were necessary for the coming semester, instead of trying to have the system in and completely operable within the first six months after purchase.

Two curriculum development specialists were hired to assist the faculty with the development of competencies. The two specialists created advisory boards from area employers in each of the occupational fields within Red Rock's Programs. Employers listed qualifications that Red Rocks graduates would need to have before they would hire the graduates. The lists were compiled for each discipline and distributed to department chairs. The department chairs made any necessary changes and then chose what course in the discipline they would track. The external advisory boards then received the final working copies of the objectives, and notified Red Rocks if they wanted to make any additional changes. If no response was given then it was considered an approval.

Organization of the project was very important. The Curriculum Development Office, which began the CMI process, had two support staff members, and the support of upper administration for overtime to meet time deadlines. Even though no one knew how the whole system was going to work, faculty, staff, and employers in the field were very cooperative -- which was of great value to us. With Title III grant money we didn't have a problem with money and everyone knew the impending accountability document would require extensive data on student success, so most participants were supportive. Having an experienced, qualified technical supervisor was the most important reason why our system worked. Those considering this type of project would do well to note this.

The faculty were informed of CMI early in the project in the context of accountability, and department chairs developed the original objective-based tests before the system was operational. They also were involved with developing the competencies through department meetings to review advisory board-recommended objectives. Their reaction was generally positive. The faculty that were most positive were the ones on the Title III team that supported CMI in the grant proposal. Many were faculty leaders, and others listened to them. Unfortunately, on the faculty side there were some negatives. Some thought that their workload was going to be increased, and some faculty were perceived to be trying to negate the whole project. These particular faculty did not feel that the objectives could be measured or quantified. Others felt they would be potentially liable if a student was said to have learned, for example, the difference between A/C and D/C circuits, but in actuality did not. Some did not like the context of accountability at all, and still do not. A few of the established faculty did not see any reason for change, and since they had been at Red Rocks the longest, many newer faculty members listened to them.

The system is now based on using reasonably priced scan forms from NCS and Scantron. ABACUS designs the forms with NCS and Scantron therefore the system is limited to the type of forms ABACUS creates. There are many forms to work with that range from multiple/choice, true/false to matching to class mastery, and even attendance. The forms have progressed, especially with the availibility of the NCS OpScan 5's capabilities. Red Rocks uses class mastery forms to track over 300 courses and sections with 3000 students for end of semester tracking. The forms allow for the entire class to be on a single form (up to 30). A list of objectives is attached, and the faculty member simply marks in a yes or no as to whether the student mastered the objective. The system works fairly well, but communication problems have slowed us down occasionally. Divisions often change the number o' their discipline courses when articulation agreements and other transfer agreements are made, and the the system has to be updated immediately when changes are made. One course may change numbers three times in the same year. Also, most part-time faculty do not know what the system is for and sometimes throw the forms away or do not return them. The CMI office is responsible for improving

communication, however with the large number of part-time faculty this is one of the most difficult communication gaps to fill.

Another function, which is the fastest growing portion of the system is objective-based tests created by the CMI office. Instructors tie objectives to each test question, and CMI codes the test, enters it and creates the test out of a test bank. In Fall 1989 the CMI office had two instructors with a 450 question test bank. This Spring, CMI had 15 instructors with an 8450-question test bank covering 13 disciplines and 28 individual sections. Thirteen percent of Red Rocks student's testing is being tracked with objective based tests. Students are becoming involved when they receive diagnostic information on each specific objective, and have begun visiting the office to ask questions on the use of the information. As an example of advantage to students, a student who has proof that he or she mastered a class based on specific test results has an advantage over another who only has a grade in the course from another school. In the future we intend to give the student certification that displays those capabilities to prospective employees.

Purchasing a new NCS scanner instead of the Scantron was a definite advantage for the CMI and faculty. The first year we had to have one form for every student because our scanner could not handle class mastery scanforms with the entire roster on a single sheet. Faculty did not appreciate having to do the initial extra work. The new scanner made end of semester tracking much easier with one sheet per class with all of the students names on it. The ability to adapt to the negative faculty response on maintaining their own test bank on the CMI was a major reason for it's success today. The office had to lure the faculty one by one onto the system, and continue to maintain the test bank for them. Not trying to put every faculty member on the CMI at one time was also positive because we are able to ease in these changes.

Staffing is very important in keeping CMI effective. At least two people are needed to be dedicated to end of semester tracking, because of the large amount of data necessary for each semester. The more staff the system has the more faculty can be recruited for objective based testing, and the larger the system can grow. The software however, is rather difficult for anyone who is not continuously involved to understand. It has many screens, and new, updated versions need to sent almost every two months. While most faculty members could do this with time, many of them don't want to be bothered. It has worked for Red Rocks to do the coding of objectives, testing and scanning for the faculty.

We are hoping to attain one hundred percent of full-time faculty participation at some future date. Currently about seventy five percent of the faculty are involved with the system, while twenty percent are not using it because their discipline is not currently involved with end of semester tracking. Five percent of the faculty want nothing to do with the system all together.

Self-paced labs have been set up, and are working very well. We currently have three labs on campus tied to the CMI, and have added an additional course this summer.

On-line testing is our next major goal. Red Rocks E.D.T. lab currently is using on line testing but without the diagnostic capability of CMI. ABACUS doesn't have too many new ways to expand, but the system is getting faster. It is a quality package that works well for our current needs.

Purchasing a system like CMI is excellent for student outcome/competency measurement tracking, if your faculty is involved. Contact ABACUS and see if your needs can be met by their system, or contact us at RRCC for a review and demonstration.

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